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Supporting Information

Facile synthesis of flower-like hierarchical N-doped Nb_2O_5/C nanostructures with efficient photocatalytic activity under visible light

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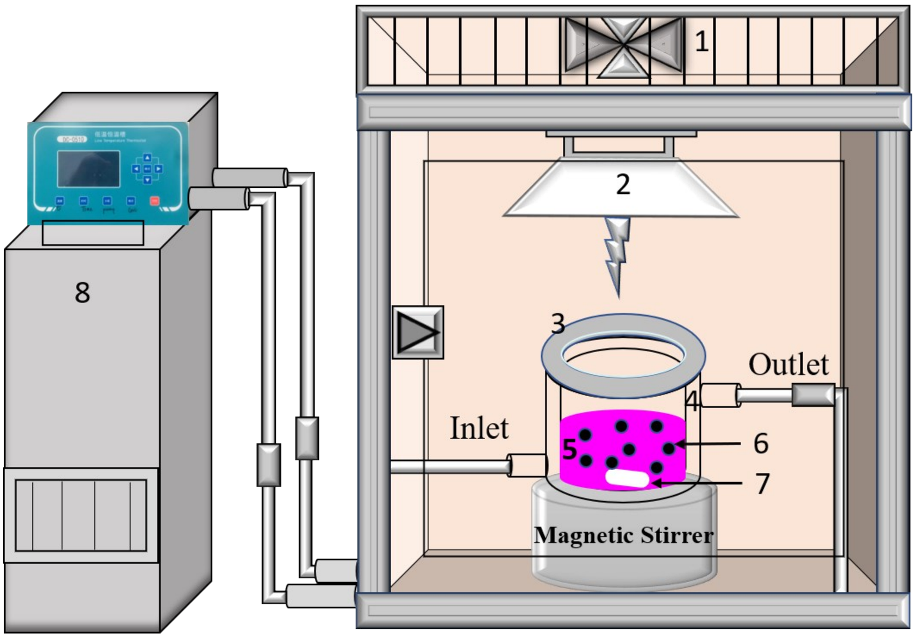
SUPPORTING FIGURES



Scheme S1. Schematic illustration for the photocatalytic reactor used in the photodegradation of RhB under visible-light illumination (1. Suction fan, 2. Xe lamp 400 W (300-800 nm), 3. Cut-of filter (λ >400 nm), 4. Cooling Jacket, 5. 200 mL quartz vessel, 6. photocatalyst, 7. Magnet bar, and 8. Low-Temperature Thermostat.).

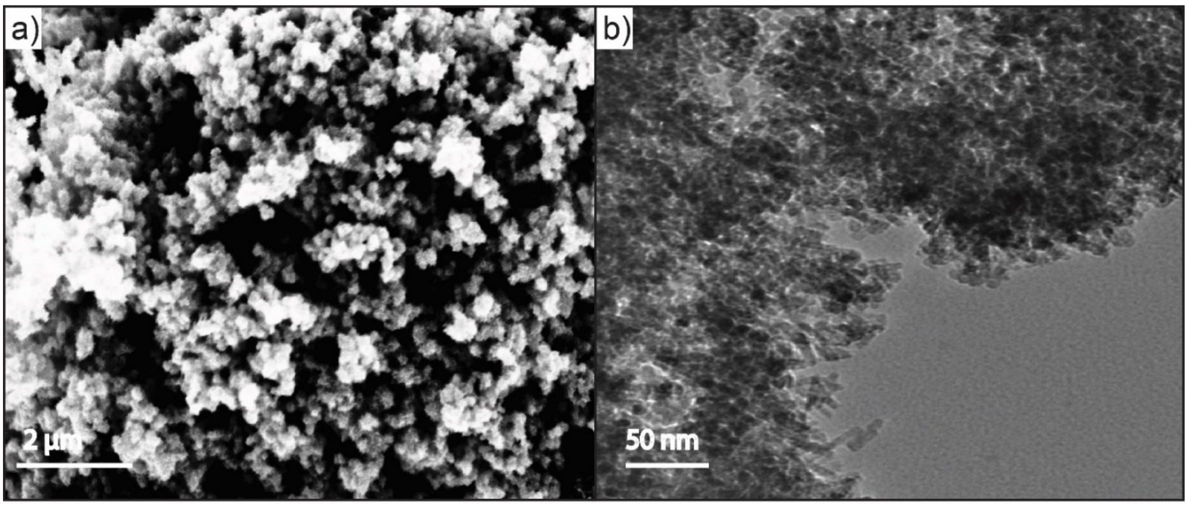


Fig. S1. (a) SEM and (b) TEM images of pure NBO at calcination temperature 350 °C.

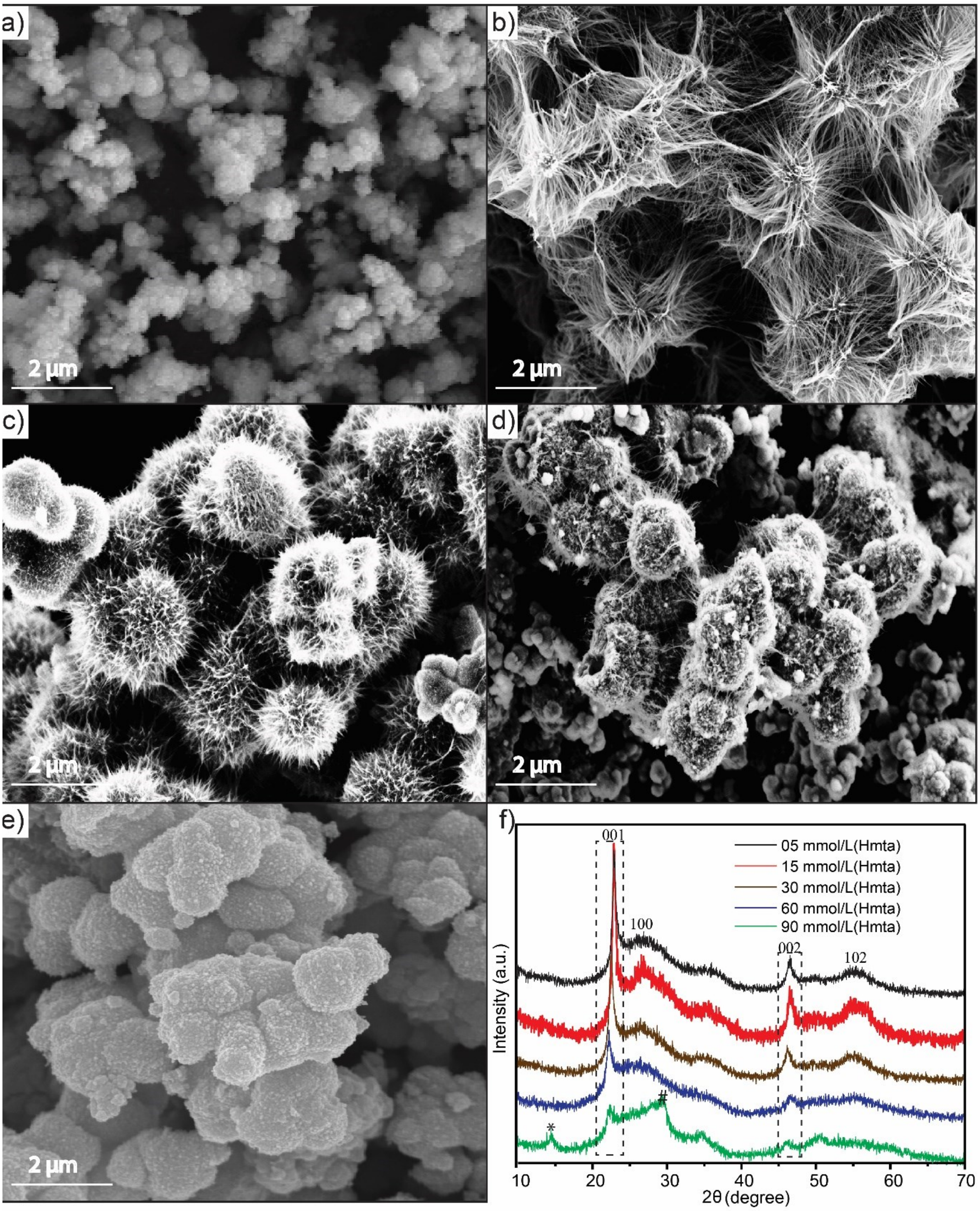


Fig. S2. SEM images and XRD patterns of NBO nanostructures synthesized by using different concentrations of Hmta: (a) 5 mmol. L^{-1}(b) 15 mmol·L^{-1}, (c) 30 mmol·L^{-1}, (d) 60 mmol·L^{-1}, (e) 90 mmol·L^{-1}.

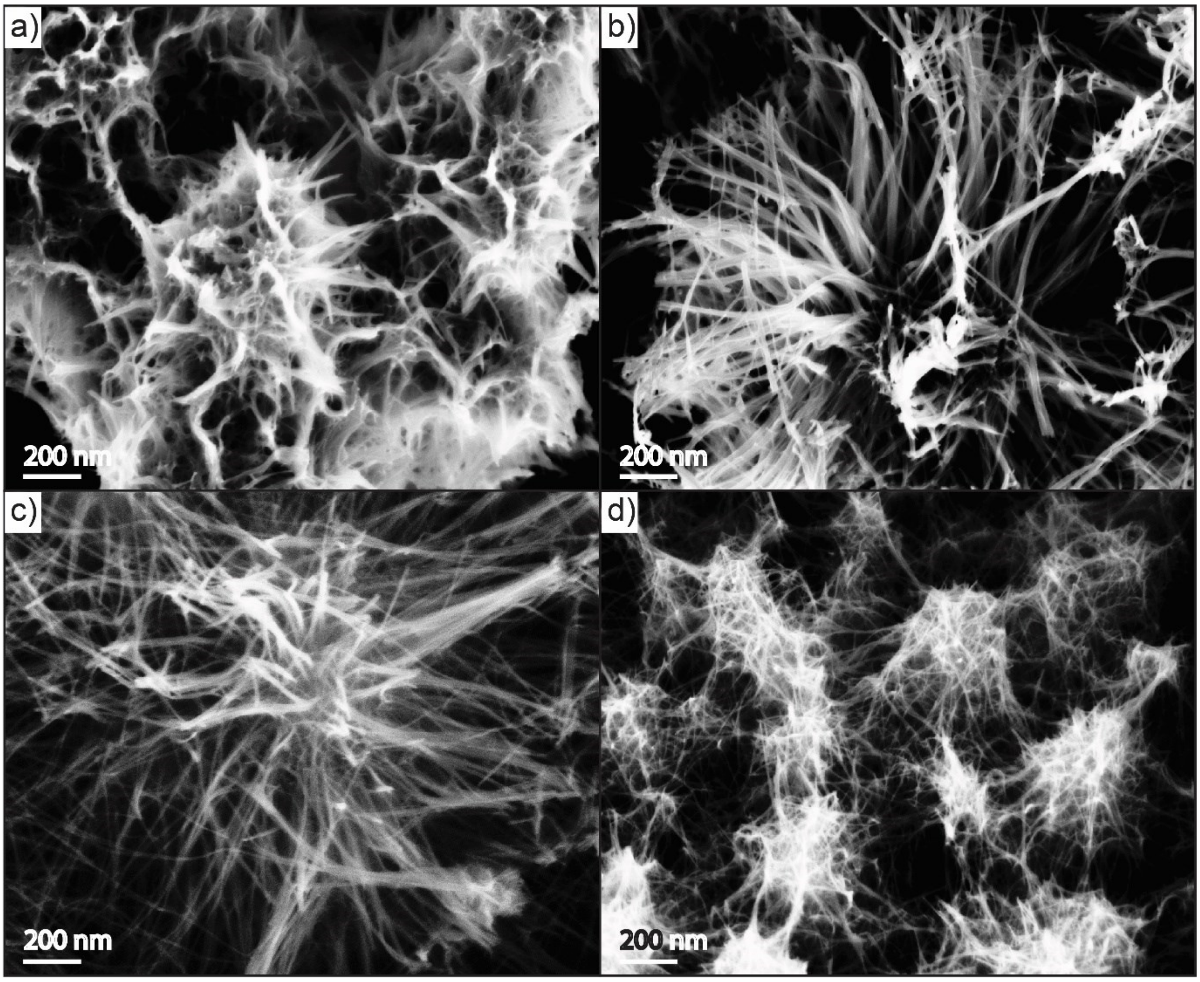


Fig. S3. SEM images of N-NBO/C nanostructures synthesized at different hydrothermal temperatures: (a) 140 °C, (b) 160 °C, (c) 180 °C, and (d) 200 °C.

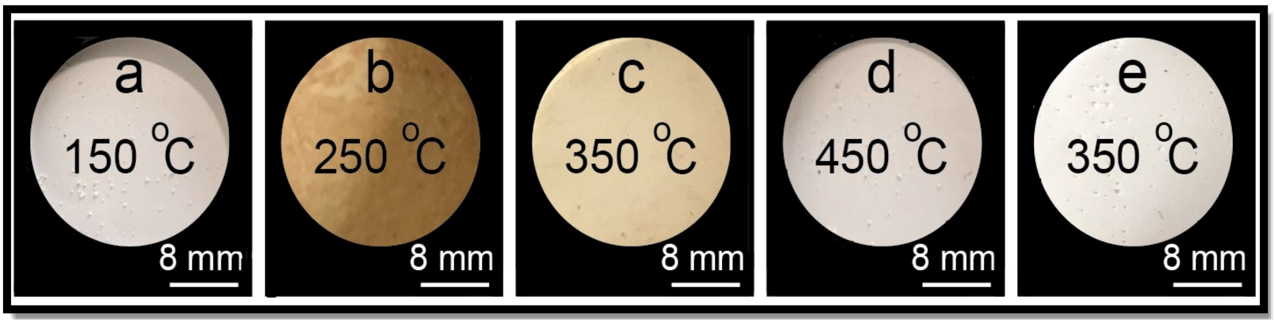


Fig. S4. Camera images of NBO nanostructures powder at different calcination temperatures of (a) 150 ℃, (b) 250 ℃, (c) 350 ℃, (d) 450 ℃, and (e) Pure NBO at 350 ℃.

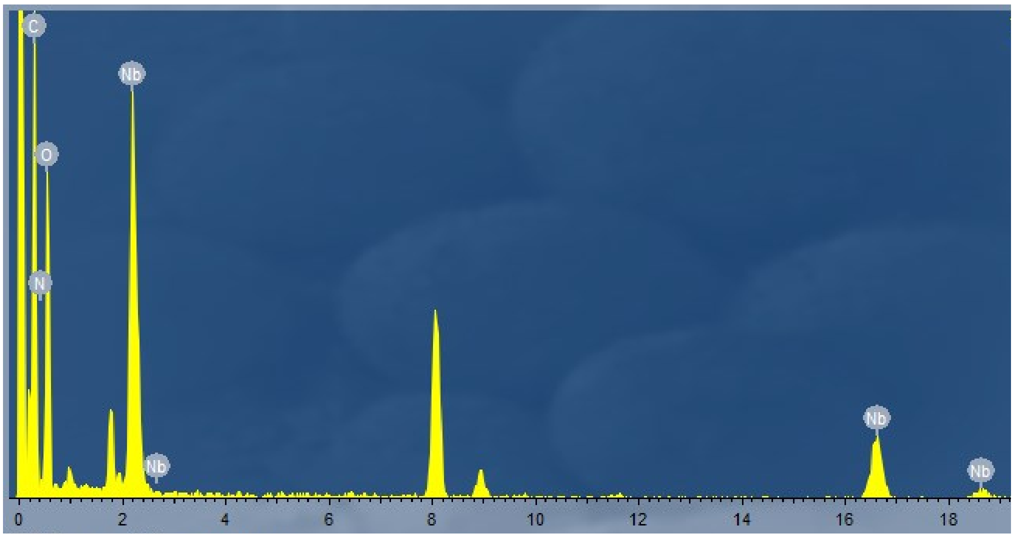


Fig. S5. EDX analysis of C, N, Nb, and O elements for N-NBO/C

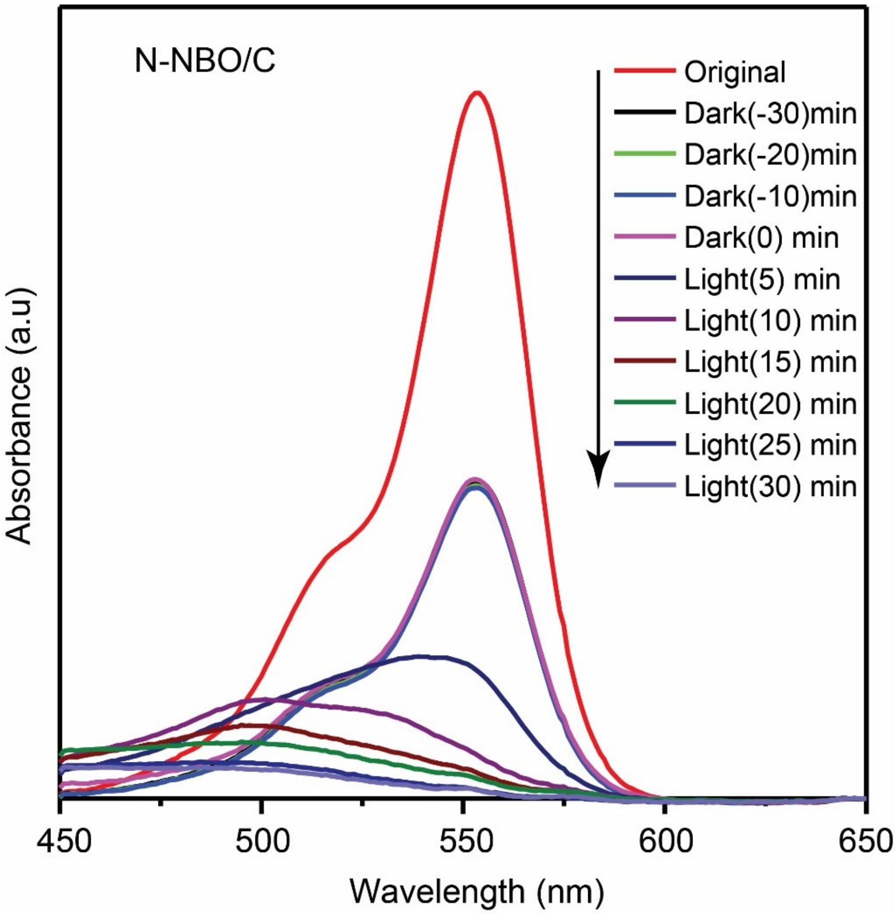


Fig. S6. UV-vis absorption spectra changes of the RhB absorbance in aqueous solution over N-NBO/C

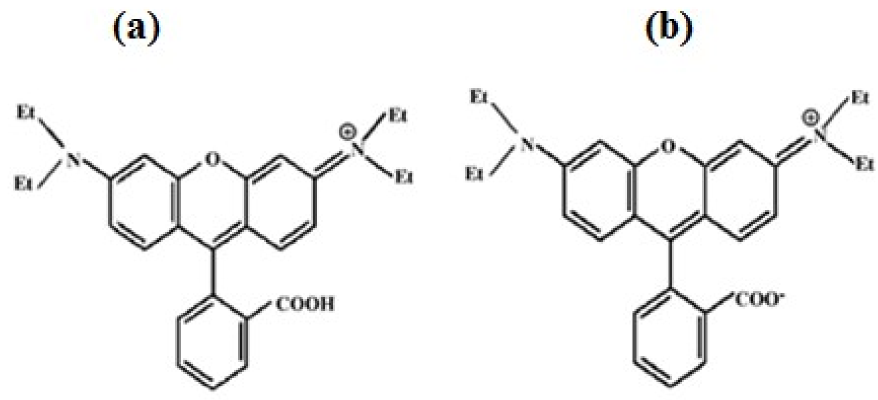


Fig. S7. Chemical structure of RhB, (a) cationic and (b) zwitterionic form.

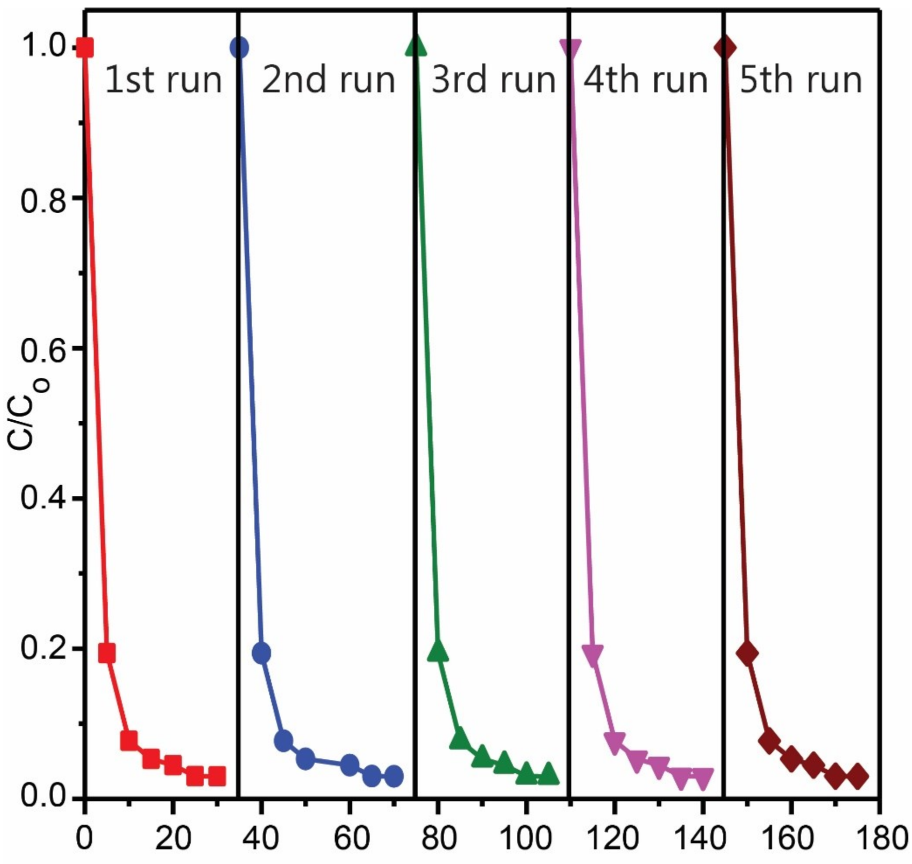


Fig. S8. The number of cycles for the photodegradation of 30 mg/L RhB in the presence of (1 g/L) N-NBO/C.

SUPPORTING TABLES

Table S1. EDX &XPS analysis of C, N, Nb, and O elements for N-NBO/C

EDX			XPS		
Element	Percentage by weight	Atomic percentage	Element	PP At. %	Atomic %
C K	37.27	64.56	C 1s	19.19	25.37
N K	0.39	0.58	N 1s	2.45	3.94
O K	19.37	25.20	O 1s	60.58	52.95
Nb K	42.98	9.63	Nb 1s	17.79	17.74
Total	100 %	100 %	Total	100 %	100 %

Table S2. Comparison of the photocatalysts conditions and conversation rate (%) between some reported catalysts for RhB degradation in aqueous solution and this work.

Photocatalyst conditions and conversation rate / Photocatalysts	Light intensity (W)	RhB concentration	Surface area m^2/g	Catalyst amount (g)/100 mL	Conversation rate (%)	References
N-NBO/C	400	30 (mg/L)	260.37	0.1	98.5 after 30 mint	This work
Ag_3VO_4/TiO_2/GR	500	10 ppm	86	0.1	94 after 40 mint	1
NBO-NNF	500	2 mM	--	0.1	99 after 90 mint	2
C-N/Nb_2O_5 nanonets	400	10 (mg/L)	229	0.1	99 after 30 mint	3
C-Nb_2O_5	500	5 (mg/L)	187	0.1	100 in 3 hours	4
C, N co-modified Nb_2O_5 nanoneedles	300	10 (mg/L)	85.6	0.1	98 after 40 mint	5
HNb_3O_8-N	300	12 (mg/L)	11.1	0.3	100 after 50 mint	6
2D layered CdS@Ti3C_2@TiO_2	300	20 (mg/L)	42.38	0.05	100 in 2 hours	7
N-Nb_2O_5	300	10 (mg/L)	14	0.3	98 after 30 mint	8

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